

Claims

What is claimed is:

1. A medical lead, comprising:
an electrically insulative membrane having a first stiffness;
5 a resilient skeletal spring layer associated with the insulative membrane,
wherein the spring layer has a second stiffness greater than the first stiffness; and
at least one electrode associated with the insulative membrane.
2. The medical lead of claim 1, wherein the insulative membrane is
flaccid.
- 10 3. The medical lead of claim 1, wherein the insulative membrane is
paddle-shaped.
4. The medical lead of claim 1, wherein the insulative membrane is tube-
shaped.
5. The medical lead of claim 1, wherein the spring layer is configured to
15 urge the insulative membrane into a planar geometry.
6. The medical lead of claim 1, wherein the spring layer is configured to
urge the insulative membrane into a curvilinear geometry.
7. The medical lead of claim 1, wherein the spring layer wraps around
onto itself.
- 20 8. The medical lead of claim 1, wherein the insulative membrane has two
opposing surfaces, the spring layer is associated with one of the two surfaces, and
the at least one electrode is associated with the other of the two surfaces.

9. The medical lead of claim 1, wherein the insulative membrane has two opposing surfaces, and the spring layer and the at least electrode are associated with the same one of the two surfaces.

10. The medical lead of claim 1, wherein the insulative membrane, spring layer, and at least one electrode form a body that is configured to inhibit tissue growth.

11. The medical lead of claim 1, wherein the insulative membrane, spring layer, and at least one electrode form a body that is configured to be collapsed into a compact form for percutaneous delivery into a patient.

10 12. The medical lead of claim 1, wherein the insulative membrane, spring layer, and at least one electrode form an expanded body that is sized to fit within the epidural space of a patient.

13. A method of treating a patient, comprising:
placing the medical lead of claim 1 into a collapsed state by applying a
15 compressive force to the medical lead;
percutaneously delivering the collapsed medical lead into the patient adjacent tissue to be treated; and
placing the medical lead into an expanded state by releasing the compressive force, whereby the resilient spring layer facilitates expansion of the medical lead.

20 14. The method of claim 13, further comprising stimulating the tissue with the medical lead.

15. The method of claim 13, wherein the tissue is spinal cord tissue.

16. A medical lead, comprising:
an electrically insulative membrane having a longitudinal axis;

a resilient spring element associated with the insulative membrane, wherein the spring element comprises a main segment that extends along the longitudinal axis and a plurality of secondary segments that branch off of the main segment; and at least one electrode associated with the insulative membrane.

5 17. The medical lead of claim 16, wherein the insulative membrane is flaccid.

18. The medical lead of claim 16,, wherein the insulative membrane is paddle-shaped.

10 19. The medical lead of claim 16, wherein the insulative membrane is tube-shaped.

20. The medical lead of claim 16, wherein the spring element is configured to urge the insulative membrane into a planar geometry.

21. The medical lead of claim 16, wherein the spring element is configured to urge the insulative membrane into a curvilinear geometry.

15 22. The medical lead of claim 16, wherein the insulative membrane has two opposing surfaces, the spring element is associated with one of the two surfaces, and the at least one electrode is associated with the other of the two surfaces.

20 23. The medical lead of claim 16, wherein the insulative membrane has two opposing surfaces, and the spring layer and the at least electrode are associated with the same one of the two surfaces.

24. The medical lead of claim 16, wherein the secondary segments bilaterally branch off of the main segment.

25 25. The medical lead of claim 16, wherein the secondary segments unilaterally branch off of the main segment.

26. The medical lead of claim 16, wherein the insulative membrane, spring element, and at least one electrode form a body that is configured to inhibit tissue growth.

27. The medical lead of claim 16, wherein the insulative membrane, spring
5 element, and at least one electrode form a body that is configured to be collapsed into a compact form for percutaneous delivery into a patient.

28. The medical lead of claim 16, wherein the insulative membrane, spring element, and at least one electrode form an expanded body that is sized to fit within the epidural space of a patient.

10 29. A method of treating a patient, comprising:

placing the medical lead of claim 16 into a collapsed state by applying a compressive force to the medical lead;

percutaneously delivering the collapsed medical lead into the patient adjacent tissue to be treated; and

15 placing the medical lead into an expanded state by releasing the compressive force, whereby the resilient spring element facilitates expansion of the medical lead.

30. The method of claim 29, further comprising stimulating the tissue with the medical lead.

31. The method of claim 29, wherein the tissue is spinal cord tissue.

20 32. A medical lead, comprising:

an electrically insulative body having a planar region;

a resilient skeletal spring element associated with the planar region of the insulative body; and

at least one electrode associated with the planar region.

33. The medical lead of claim 32, wherein the planar region of the insulative body is flaccid.

34. The medical lead of claim 32, wherein the planar region of the insulative body is paddle-shaped.

5 35. The medical lead of claim 32, wherein the planar region of the insulative body is tube-shaped.

36. The medical lead of claim 32, wherein the planar region of the insulative body has two opposing surfaces, the spring element is associated with one of the two surfaces, and the at least one electrode is associated with the other of the
10 two surfaces.

37. The medical lead of claim 32, wherein the planar region of the insulative body has two opposing surfaces, and the spring element and the at least electrode are associated with the same one of the two surfaces.

38. The medical lead of claim 32, wherein the insulative membrane, spring
15 element, and at least one electrode form a body that is configured to inhibit tissue growth.

39. The medical lead of claim 32, wherein the insulative membrane, spring element, and at least one electrode form a body that is configured to be collapsed into a compact form for percutaneous delivery into a patient.

20 40. The medical lead of claim 32, wherein the insulative membrane, spring element, and at least one electrode form an expanded body that is sized to fit within the epidural space of a patient.

41. A method of treating a patient, comprising:
placing the medical lead of claim 32 into a collapsed state by applying a
25 compressive force to the medical lead;

percutaneously delivering the collapsed medical lead into the patient adjacent tissue to be treated; and

placing the medical lead into an expanded state by releasing the compressive force, whereby the resilient spring element facilitates expansion of the medical lead.

5 42. The method of claim 41, further comprising stimulating the tissue with the medical lead.

43. The method of claim 41, wherein the tissue is spinal cord tissue.